IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

February 4, 2003

In re application of: GEORGE E. BITTNER
Application No.: 09/931,607
Filed: August 16, 2001
For: APPARATUS AND METHOD FOR A HEAT ENGINE

Response/Amendment

Please amend the application as follows:

In the Claims:

Please delete claims 3-5, 8, 9, 14, 18, 20-38, 41-43, 46, 49, 54-56, 58, 62, 67-69, 71 and 75.

Please amend claims 1, 10, 12, 15-17, 39, 48, 50, 51, 53, 61, 63, 66, 74 and 76, as set forth in the attached pages.

Please add claims 80-87, as set forth in the attached pages.

Remarks

In an office action dated November 4, 2002, the Examiner rejected Applicant's claims 1-79, pursuant to 35 U.S.C. § 102(b), as being anticipated by U.S. Patent Nos. 4121420 to Schur, 4051678 to Yates and 4074534 to Morgan.

Applicant has amended the claims to particularly point out and distinctly claim the novelty of the invention. Specifically, Applicant has amended existing claims and added new claims which distinctly claim the self-starting nature of Applicant's invention, which is a result of the fact that Applicant's invention does not rely on the heating source heating an expansion

chamber located at the bottom of the heat engine. Applicant has also amended the claims to more particularly point out that Applicant's invention does not require that the expansion chambers be directly opposed, but allows operation if the heating expansion chamber and cooling expansion chamber are positioned such that they are as close as 45° to each other and as far apart as 180° from each other.

Discussion

The Examiner rejected claims 1-79 as being anticipated by Schur. Applicant respectfully traverses the rejection and directs the Examiner to the following differences between Applicant's invention and that disclosed in Schur.

Schur teaches heating the expansible chambers by "a heat source in the form of a hot water trough disposed in the rotating path of the exterior tanks at the bottom portion of the structure." Applicant's invention discloses a heating source that can be applied from any portion of the structure. In fact, bottom heating, as disclosed in Schur, is inefficient because it necessarily directs weight displacement only in an upward direction. A heat engine as disclosed in Schur is not "self starting" and can only be made to operate by imparting external initiating torque: "Rotational torque is imparted to the annulus 10 by means which ensure that almost all of the weight of the water within container 15 is on the right-hand side ... of the closed container 15, thereby imparting a clockwise movement to the rotor or annulus 10." Schur at column 5, lines 16-21.

Applicant's invention is self starting. Upon application of heat, Applicant's invention displaces weight from one side of the engine to the opposite side; it does not displace weight directly upward as disclosed in Schur. As a result, there is always a self-generated torque that is

capable of starting rotation of Applicant's invention. Therefore, Applicant believes his invention is not anticipated by Schur.

The Examiner rejected claims 1-79 as being anticipated by Yates. Applicant respectfully traverses the rejection and directs the Examiner to the following differences between Applicant's invention and that disclosed in Yates.

Yates teaches providing heat provided by "[a] hot water reservoir ... positioned on the ground so that, as disc 20 rotates, each evaporator coil 36 passes in turn through reservoir 44 while in the lowermost position of rotation." As with Schur, the weight displacement generated by bottom heating is vertically upward. In addition to the fact that such designs are not self starting, as described above, the design disclosed in Yates is also less efficient than Applicant's invention. Even after rotation begins, only a small component of the moment generated by the vertical weight shift is horizontal. That is, more energy must be drawn from the heat source to produce rotation of the engine than in Applicant's invention because Applicant's invention relies on substantially horizontal weight displacement that can be converted almost entirely into rotational energy.

In addition, Yates teaches radially opposed tanks. That is, tanks that are directly opposite each other. Applicant's invention requires no such limitation. Applicant's invention teaches that tanks may be positioned either directly opposite each other (180° relative to each other) or some other angle relative to each other, even as close as 45°. Therefore, Applicant believes his invention is not anticipated by Yates.

The Examiner rejected claims 1-79 as being anticipated by Morgan. Applicant respectfully traverses the rejection and directs the Examiner to the following differences between Applicant's invention and that disclosed in Morgan.

As with Schur and Yates, Morgan teaches bottom heating of the heat engine. Morgan requires that heat be applied at the bottom of the engine's path of rotation. As described above, such an arrangement results in vertical weight displacement, which does not cause such an engine to be self starting and, once started, is less efficient that lateral weight displacement as disclosed in Applicant's invention. In addition, Morgan, as in Yates, teaches diagonally opposed pairs of tanks. As described above, Applicant's invention discloses tanks that may be directly opposed or may be as close as 45° relative to each other. Therefore, Applicant believes his invention is not anticipated by Morgan.

Applicant believes that the set of claims is in condition for allowance and earnestly requests that the claims pass to issue. If the Examiner believes that contact with Applicant's attorney would aid in the examination of the application, the Examiner is requested to contact Applicant's attorney at the telephone number listed below. The Examiner is hereby authorized to charge any required fees not included herewith to Deposit Account 50-1546.

Date: February 4, 2003

Respectfully submitted,

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1. A heat engine in combination:

a) a plurality of heating side expansion chambers and cooling side expansion chambers, positioned on opposite sides of [an axis]a circle, wherein said cooling side expansion chambers lag said heating side expansion chambers for expanding and contracting fluids;

b) a first wall communicating with said heating side expansion chamber for pushing when a second fluid expands and a second wall communicating with said cooling side expansion chamber for pulling when a first fluid contracts;

c) a means for shifting a weight off-center balance when said first wall pushes said second moment element and a second wall pulls said first moment element, allowing gravity to rotate the apparatus about the axis of said [axis]circle;

d) a heat source for expanding said fluids;

e) a cooling source for contracting said fluids; and

f) a structure for supporting said expansion chambers, heat and cooling source, and providing an output motion in a particular direction from the rotation of said apparatus.

2. The heat engine as claimed in claim 1, wherein said heat is from a plurality of sources.

3. [The heat engine as claimed in claim 1, wherein said motion is rotational.]

4. [The heat engine as claimed in claim 1, wherein said motion is linear.]

5 [The heat engine as claimed in claim 1, wherein said motion is reciprocal.]

6. The heat engine as claimed in claim 1, wherein said expansion chamber is selected from the group consisting of a bladder, diaphragm, and membrane.

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7. The heat engine as claimed in claim 1, wherein said expansion chamber is a plurality of shapes.

8. [The heat engine as claimed in claim 1, wherein said fluid is a gas.]

9. [The heat engine as claimed in claim 1, wherein said fluid is a liquid.]

10. The heat engine as claimed in claim 7, wherein said shape further comprises at least one side of transparent material allowing said chamber to act as a solar collector.

11. The heat engine as claimed in claim 1, wherein said expansion chamber is a plurality of materials.

12. The heat engine as claimed in claim [9,]1, wherein said [liquid]fluid is highly expandable.

13. The heat engine as claimed in claim 1, wherein said heating side expansion chamber and said cooling side expansion chamber are diametrically opposed about the axis.

14. [The heat engine as claimed in claim 13, wherein said cooling side is positioned and lags said heating side.]

15. The heat engine as claimed in claim [14,]1, wherein said heating side expansion chamber and said cooling [sides]side expansion chamber are positioned about 45 degrees to [180]315 degrees apart.

16. The heat engine as claimed in claim 1, wherein said means for shifting a weight is a first piston connected to said [elastic]first wall and a second piston connected to said second wall that creates said off-center balance.

17. The heat engine as claimed in claim 1, wherein said means for shifting a weight is a channel allowing flow of said fluid, from said heating side to cooling side, by expansion of said heating side chamber [elastic]first wall and the contraction of said cooling side chamber [elastic]second wall that creates said off-center balance.

18. [The heat engine as claimed in claim 1, wherein said fluids expand and contract on the same side and plane of said axis.]

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19. The heat engine as claimed in claim 1, wherein said cooling is from a plurality of sources.

20. [A method of operating a heat engine apparatus comprising:]

[(a) engaging a heat source;]

[(b) heating and cooling a plurality of expansion chambers for expanding or contracting a fluid that with a weight shifting means moves said weight to an off-balance position providing a rotation of the apparatus; and]

[(c) operating a structure for providing direction of said rotation.]

21. [The method of operating a heat engine as claimed in claim 20, wherein said heat is from a plurality of sources.]

22. [The method of operating a heat engine as claimed in claim 20, wherein said motion is rotational.]

23. [The method of operating a heat engine as claimed in claim 20, wherein said motion is linear.]

24. [The method of operating a heat engine as claimed in claim 20, wherein said motion is reciprocal.]

25. [The method of operating a heat engine as claimed in claim 20, wherein said expansion chamber is selected from the group consisting of a bladder, diaphragm, and membrane.]

26. [The method of operating a heat engine as claimed in claim 20, wherein said expansion chamber is a plurality of shapes.]

27. [The method of operating a heat engine as claimed in claim 20, wherein said fluid is a gas.]

28. [The method of operating a heat engine as claimed in claim 20, wherein said fluid is a liquid.]

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29. [The method of operating a heat engine as claimed in claim 26, wherein said shape further comprises one side of transparent material allowing said expansion chamber to further act as a solar collector.]

30. [The method of operating a heat engine as claimed in claim 20, wherein said expansion chamber is a plurality of materials.]

31. [The method of operating a heat engine as claimed in claim 28, wherein said liquid is highly expandable.]

32. [The method of operating a heat engine as claimed in claim 20, wherein said heating side expansion chamber and said cooling side expansion chamber are diametrically opposed about the axis.]

33. [The method of operating a heat engine as claimed in claim 32, wherein said cooling side is positioned and lags said heating side.]

34. [The method of operating a heat engine as claimed in claim 33, wherein said sides are positioned about 45 degrees to 180 degrees apart.]

35. [The method of operating a heat engine as claimed in claim 20, wherein said means for shifting a weight is a piston connected to said elastic wall that creates said off-center balance.]

36. [The method of operating a heat engine as claimed in claim 20, wherein said means for shifting a weight is a channel allowing movement of said fluid, from said heating side chamber to said cooling side chamber, by expansion of said heating side chamber elastic wall and contraction of said cooling side chamber elastic wall that creates said off-center balance.]

37. [The method of operating a heat engine as claimed in claim 20, wherein said fluids expand and contract on the same side and plane of said axis.]

38. [The method of operating a heat engine as claimed in claim 20, wherein said heat is from a plurality of sources.]

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39. A heat engine in combination:

a) a plurality of heating side expansion chambers and cooling side expansion chambers, positioned on opposite sides of [an axis]a circle, for expanding and contracting fluids;

b) a means for shifting a weight off-center balance when said fluids [expands]expand or [contracts]contract, allowing gravity to rotate the apparatus about the axis of said [axis]circle;

c) a heat source for expanding said fluids;

d) a cooling source for contracting said fluids; and

e) a structure for supporting said expansion chambers, heat and cooling source, and providing an output motion in a particular direction from the rotation of said apparatus.

40. The heat engine as claimed in claim 39, wherein said heat is from a plurality of sources.

41. [The heat engine as claimed in claim 39, wherein said motion is rotational.]

42. [The heat engine as claimed in claim 39, wherein said motion is linear.]

43. [The heat engine as claimed in claim 39, wherein said motion is reciprocal.]

44. The heat engine as claimed in claim 39, wherein said expansion chamber is a plurality of shapes.

45. The heat engine as claimed in claim 39, wherein said expansion chamber is selected from the group consisting of a flexible member, an elastic membrane, a diaphragm and a bladder.

46. [The heat engine as claimed in claim 39, wherein said fluid is a liquid.]

47. The heat engine as claimed in claim 39, wherein said expansion chamber is a plurality of materials.

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48. The heat engine as claimed in claim [46,]39, wherein said [liquid]fluid is highly expandable.

49. [The heat engine as claimed in claim 390, wherein said cooling side is positioned and lags said heating side.]

50. The heat engine as claimed in claim [49,]39, wherein said heating and cooling sides are positioned about 45 degrees to [180]315 degrees apart.

51. The heat engine as claimed in claim 39, wherein said means for shifting a weight is a channel allowing movement of said fluid, from said heating side chamber to said cooling side chamber[, by expansion of said fluid around said baffles that creates said off-center balance].

52. The heat engine as claimed in claim 39, wherein said cooling is from a plurality of sources.

53. A heat engine in combination:
a) a plurality of heating side expansion chambers and cooling side expansion chambers, positioned on opposite sides of [an axis]a circle, for expanding and contracting fluids;
b) a means for rotating an element about [an]the axis of said circle, when said fluids [expands]expand or [contracts]contract, by using inward moving actuators radial positioned about said axis;
c) a heat source for expanding said fluids;
d) a cooling source for contracting said fluids; and
e) a structure for supporting said expansion chambers, heat and cooling source, said element, and providing an output motion in a particular direction from the rotation of said apparatus.

54. [The heat engine as claimed in claim 53, wherein said motion is rotational.]

55. [The heat engine as claimed in claim 53, wherein said motion is linear.]

56. [The heat engine as claimed in claim 53, wherein said motion is reciprocal.]

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57. The heat engine as claimed in claim 53, wherein said expansion chamber is a plurality of shapes.

58. [The heat engine as claimed in claim 53, wherein said fluid is a liquid.]

59. The heat engine as claimed in claim 53, wherein said expansion chamber is a plurality of materials.

60. The heat engine as claimed in claim 53, wherein said heating is from a plurality of sources.

61. The heat engine as claimed in claim [58,]53, wherein said [liquid]fluid is highly expandable.

62. [The heat engine as claimed in claim 53, wherein said cooling side is positioned and lags said heating side.]

63. The heat engine as claimed in claim [62,]53, wherein said heating side expansion chamber and said cooling [sides]side expansion chamber are positioned about 45 degrees to [180]315 degrees apart.

64. The heat engine as claimed in claim 53, wherein said element is selected from the group consisting of a cam, and a crank shaft.

65. The heat engine as claimed in claim 53, wherein said cooling is from a plurality of sources.

66. A heat engine in combination:

a) a plurality of heating side expansion chambers and cooling side expansion chambers, positioned on opposite sides of [an axis]a circle, for expanding and contracting fluids;

b) a means for rotating a ring about [an]the axis of said circle, when said fluids expand or contract, by using outward moving actuators [radial]radially positioned about said axis;

c) a heat source for expanding said fluids;

d) a cooling source for contracting said fluids; and

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e) a structure for supporting said expansion chambers, heat and cooling source, said element, and providing an output motion in a particular direction from the rotation of said apparatus.

67. [The heat engine as claimed in claim 66, wherein said motion is rotational.]

68. [The heat engine as claimed in claim 66, wherein said motion is linear.]

69. [The heat engine as claimed in claim 66, wherein said motion is reciprocal.]

70. The heat engine as claimed in claim 66, wherein said expansion chamber is a plurality of shapes.

71. [The heat engine as claimed in claim 66, wherein said fluid is a liquid.]

72. The heat engine as claimed in claim 66, wherein said expansion chamber is a plurality of materials.

73. The heat engine as claimed in claim 66, wherein said heating is from a plurality of sources.

74. The heat engine as claimed in claim [71,]66, wherein said [liquid]fluid is highly expandable.

75. [The heat engine as claimed in claim 66, wherein said cooling side is positioned and lags said heating side.]

76. The heat engine as claimed in claim [75,]66, wherein said heating side expansion chamber and said cooling [sides]side expansion chamber are positioned about 45 degrees to [180]315 degrees apart.

77. The heat engine as claimed in claim 66, wherein said ring is selected from a plurality of materials.

78. The heat engine as claimed in claim 66, wherein said cooling is from a plurality of sources.

80. The heat engine as claimed in claim 1, wherein said heat source and said cooling source are applied in such a way that substantially all of the induced

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weight shift is from a position between 1° and 179° relative to top dead center of the engine, to a position between 181° and 359° relative to top dead center.

81. The heat engine as claimed in claim 1, wherein said heat engine can be made to rotate without application of external initiating torque.

82. The heat engine as claimed in claim 39, wherein said heat source and said cooling source are applied in such a way that substantially all of the induced weight shift is from a position between 1° and 179° relative to top dead center of the engine, to a position between 181° and 359° relative to top dead center.

83. The heat engine as claimed in claim 39, wherein said heat engine can be made to rotate without application of external initiating torque.

84. The heat engine as claimed in claim 53, wherein said heat source and said cooling source are applied in such a way that substantially all of the induced weight shift is from a position between 1° and 179° relative to top dead center of the engine, to a position between 181° and 359° relative to top dead center.

85. The heat engine as claimed in claim 53, wherein said heat engine can be made to rotate without application of external initiating torque.

86. The heat engine as claimed in claim 66, wherein said heat source and said cooling source are applied in such a way that substantially all of the induced weight shift is from a position between 1° and 179° relative to top dead center of the engine, to a position between 181° and 359° relative to top dead center.

87. The heat engine as claimed in claim 66, wherein said heat engine can be made to rotate without application of external initiating torque.